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10/588,304	08/03/2006	Motoyoshi Murakami	2006_1169A	6882
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EXAMINER				
CHAU, LISA N				
ART UNIT		PAPER NUMBER		
1794				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/588,304

Applicant(s)

MURAKAMI ET AL.

Examiner

Lisa Chau

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 46, 51-82, 84, 89 and 91 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 46, 51-82, 84, 89, and 91 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ ~~Notice of Informal Patent Application~~
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Examiner acknowledges amended Claims 46, 51, 58, 62, 64, 68-71, 73-75, 79, and 82, cancelled Claims 47-50, 83, 85-88, and 90, and new Claim 91 in the response filed on 11/24/09. Examiner also acknowledges the amended Abstract and Specification in the response.

Response to Arguments

2. Applicant's arguments with respect to claim 46 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 91 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regards to Claim 91, there is no support in the written description that *each thin film of the plurality of thin films* has a thermal conductivity of 2.5×10^5 erg/(s·K·cm) or lower.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 51 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regards to Claim 51, if the thermal conductivity of 1×10^6 erg/(s·K·cm) or less is referred to the second thin film, then the instant claim is considered indefinite.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, Claim 51 recites the broad recitation includes a thin film with a thermal conductivity of 1×10^6 erg/(s·K·cm) or less, and the claim also recites thermal conductivity of the second film is 2.5×10^5

erg/(s·K·cm) or lower (from Claim 46, which Claim 51 is dependent from) which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 46, 51-55, 59-77, 79-82, 84, 89, and 91 are rejected under 35

U.S.C. 103(a) as being unpatentable over US Pub. No. 20030099903 ("Liang et al.") in view of JP 2001256686 ("Takahashi et al.") provided in the IDS. The Examiner notes that JP '686 is the English language equivalent of US Pub. No. 20040257920 and all citations will refer to US '920.

With regards to Claims 46, 51, 54, 55, 59, 61-67, 77, 89, and 91, Liang et al. teaches an optical magnetic recording medium comprising a pit-shaped pattern disk substrate (7), a magnetically anisotropic recording film (2), and protective layer comprising a plurality of thin films (3 and 4). Liang et al. further teaches the thermal conductivity of the SiN second thin film (3) is higher than the ZnS/SiO₂ first thin film (4) (Fig. 1, [0015], and [0020]).

Liang et al. does not teach lubricating layers and the specific value of thermal conductivity of the second thin film (3) to be 2.5×10^5 erg/(s·K·cm) or lower. Furthermore, Liang et al. does not explicitly teach the protective thin films (3 and 4) having a lower thermal conductivity than the recording film (2).

However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made that the protective thin films (3 and 4) of Liang et al. have a lower thermal conductivity than the recording layer (2), because it is obvious to one of ordinary skill that using a laser beam to record information on the recording layer (2) would have a thermal conductivity higher in order to record data successfully (Abstract and [0021]).

Takahashi et al. teaches the thermal conductivity for ZnS containing SiO₂ (material used for Liang et al.'s first thin film (4)) has a thermal conductivity of not more than $2 \times 10^5 \text{ erg/(K}\cdot\text{cm}\cdot\text{s)}$ [0052]. Therefore, Liang et al.'s second thin film (3) has to be more than $2 \times 10^5 \text{ erg/(K}\cdot\text{cm}\cdot\text{s)}$ to meet the thermal conductivity property of the second thin film (3) being higher than the first thin film (4), and thus meeting the instant claim of the second thin film (3) is $2.5 \times 10^5 \text{ erg/(s}\cdot\text{K}\cdot\text{cm)}$ or lower. Examiner notes that SiN is used for the second thin film (3) in Liang et al, and Applicants disclosed that the thermal conductivity of SiN is from $0.13 \times 10^6 \text{ erg/(s}\cdot\text{K}\cdot\text{cm)}$ to $1 \times 10^6 \text{ erg/(s}\cdot\text{K}\cdot\text{cm)}$ ([0219] of Applicant's PGPub).

Takahashi et al. teaches plurality of lubricating layers (77 and 78) disposed over the protective layers (75 and 76) and meeting the material limitations as claimed by Applicants in its magneto-optical recording medium (Fig. 8, [0069], and [0123]). The plurality of lubricating layers each has a different thermal conductivity because each layer is made with different materials. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to insert lubricating layers over

Liang et al.'s protective layers (3 and 4) to protect the medium by suppressing friction between the recording head and the surface of the medium [0069].

With regards to Claim 52 and 53, Liang et al. does not teach the protective layer including diamond-like carbon.

However, Takahashi et al. teaches using diamond like carbon in its protective layer [0057]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the materials used by Takahashi et al. in Liang et al.'s protective layer to obtain a desired end use of a magnetic medium.

With regards to Claim 60, Liang et al. does not teach a metal material of titanium, tantalum, and chromium in its protective layer.

However, Takahashi et al. teaches its protective layer including metal material composed of titanium, tantalum, and chromium [0057]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include Ti, Ta, and Cr in Liang et al.'s protective layer in order to improve durability [0057].

With regards to Claims 68-70, Liang et al. in view of Takahashi et al. teaches the lubricating layers as set forth above. Liang et al. teaches the thickness of the first and second thin films (3 and 4) of the protective layers to be both between 50 and 500 Å [0020]. Takahashi et al. the thickness of the lubricating layer is not less than 1 nm [0069]. Therefore, the combination of Liang et al. in view of Takahashi et al. teaches the combined thickness of the lubricating and protective layers, the thickness of the lubricating layer, and the thickness of the protective layer as claimed by Applicants.

With regards to Claim 71-76, Liang et al. does not teach recording film as claimed.

However, Takahashi et al. teaches the recording film comprising a plurality of perpendicular anisotropic TbFeCo magnetic recording layers of a recording layer (63), an intermediate layer (64), and a reproduction layer (65) (Fig. 7 and [0119]). It is intrinsic, in Takahashi et al., that the recording domain formed on the recording layer in the recording film is transferred to the reproduction layer, and recorded information is reproduced by domain wall displacement in the reproduction layer. Takahashi et al. further teaches the recording layer include TbFeCo with different compositional ratio [0123]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute Liang et al.'s recording layer (2) for Takahashi et al.'s recording layer structure to obtain a stable and desired recording medium [0146].

With regards to Claims 79-81 and 84, Liang et al. a dielectric layer (1) containing a chalcogen provided on the disk substrate (7) [0019]. Liang et al. does not teach a metal layer with a high thermal conductivity.

However, Takahashi et al. teaches a metal layer provided between the disk substrate and the recording film. Takahashi et al. further teaches a dielectric layer is provided between the disk substrate and the metal layer or the between the metal layer and recording film ([0042] and [0064]). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate a metal layer as demonstrated by Takahashi et al. to reduce recording noise [0042].

With regards to Claim 82, the limitation of the metal layer or the dielectric layer having an etched surface, product-by-process claims are limited by and defined by the process and the determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. "If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113). In the instant case, Takahashi et al. has the same layers as Applicants and would intrinsically have an etched surface.

Liang et al. in view of Takahashi et al. is silent about the metal layer or the dielectric layer having a surface roughness Ra of at least 0.5 nm.

However, Takahashi et al. teaches the Ra of the substrate is 0.5 nm [0019]. It is obvious to one of ordinary skill in the art at the time of the invention was made that any subsequent layers over the substrate has an Ra of at least 0.5 nm in order to obtain a smooth magneto-optical magnetic recording medium due to smoothness of the layers ([0030], [0044], and [0148]). Therefore, it is obvious that Liang et al. in view of Takahashi et al.'s metal layer or dielectric layer has a Ra of 0.5 nm.

9. Claims 56-58, and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pub. No. 20030099903 ("Liang et al.") in view of JP 2001256686 ("Takahashi et al.") as applied to claim 46 above, and further in view of US Patent No. 6051298 ("Ko et al.").

Liang et al. teaches a pit-shaped pattern on the substrate and the protective layer comprising a ceramic material as set forth above ([0015] and [0020]). Takahashi et al. does not explicitly teach using polytetrafluoroethylene in its protective layer and the pit-shaped pattern is smaller than the smallest pattern of the recording domain is formed on the disk substrate.

However, Ko et al. teaches using polytetrafluoroethylene in its protective film (Col. 6, Lines 8-12). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have Takahashi et al.'s protective layer made of polytetrafluoroethylene as demonstrated by Ko et al. in order to protect its medium from scratches and contamination by water or oil (Col. 6, Lines 18-21).

In addition, Ko et al. teaches a pit-shaped pattern is formed on the disk substrate according to the pattern of the recording domain formed in the recording layer, wherein the pit-shaped pattern is smaller than the smallest pattern of the recording domain formed in the recording layer (Fig. 3 and Col. 1, Lines 28-32). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have Liang et al. have the same pit-shaped pattern as Ko et al. to achieve a high density optical disc for information recording and retrieval when using a laser beam to read data from the presence or absence of pits (Col. 1, Lines 12-15).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa Chau whose telephone number is (571)270-5496. The examiner can normally be reached on Monday-Friday 8:30 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on (571) 272 - 1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LC/
Lisa Chau

/Holly Rickman/
Primary Examiner, Art Unit 1794